Impact of public sewage treatment plants on the Great Barrier Reef

Great Barrier Reef in Trouble

Recent science confirms the Great Barrier Reef (GBR) continues to be damaged by catchment runoff. Nitrogen, sediments and pesticides have been shown to be key causes of reef deterioration, second only to climate change.

Addressing Priority Runoff

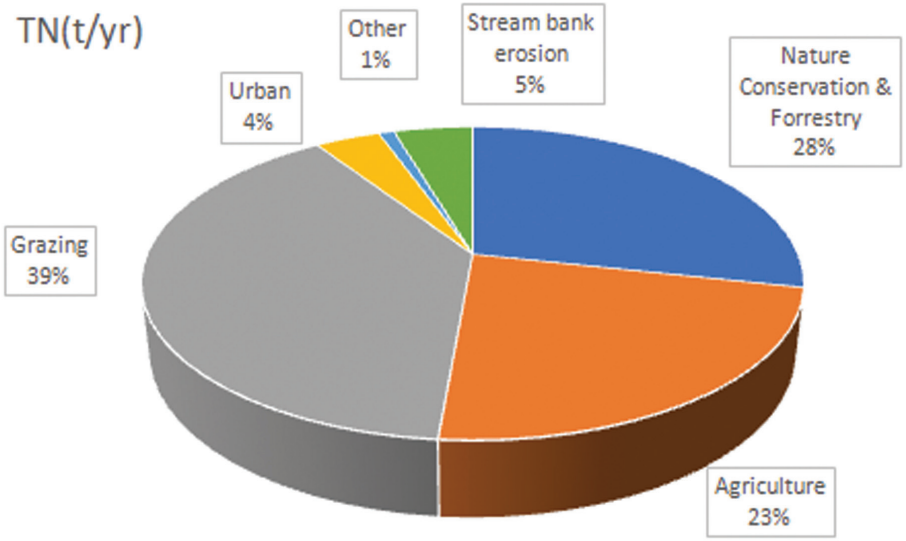
Of the 90 STPs within 50 km of the GBR only 29 are designed to achieve highest possible nitrogen removal but together they treat 60% of the sewage collected.

Sewage Treatment Plants (STPs) are strictly regulated because of their potential to impact water quality. However, they contribute less than 4% of nitrogen loads and negligible amounts of sediment and pesticides to the total runoff coming from GBR catchments. The relatively small contribution of STPs is in part thanks to significant public investment since the 1990s. Between 2000 and 2014, over $600m was invested in public STPs and local governments continue to invest in reef protection activities including STP upgrades with $230m expenditure reported for 2014/15.

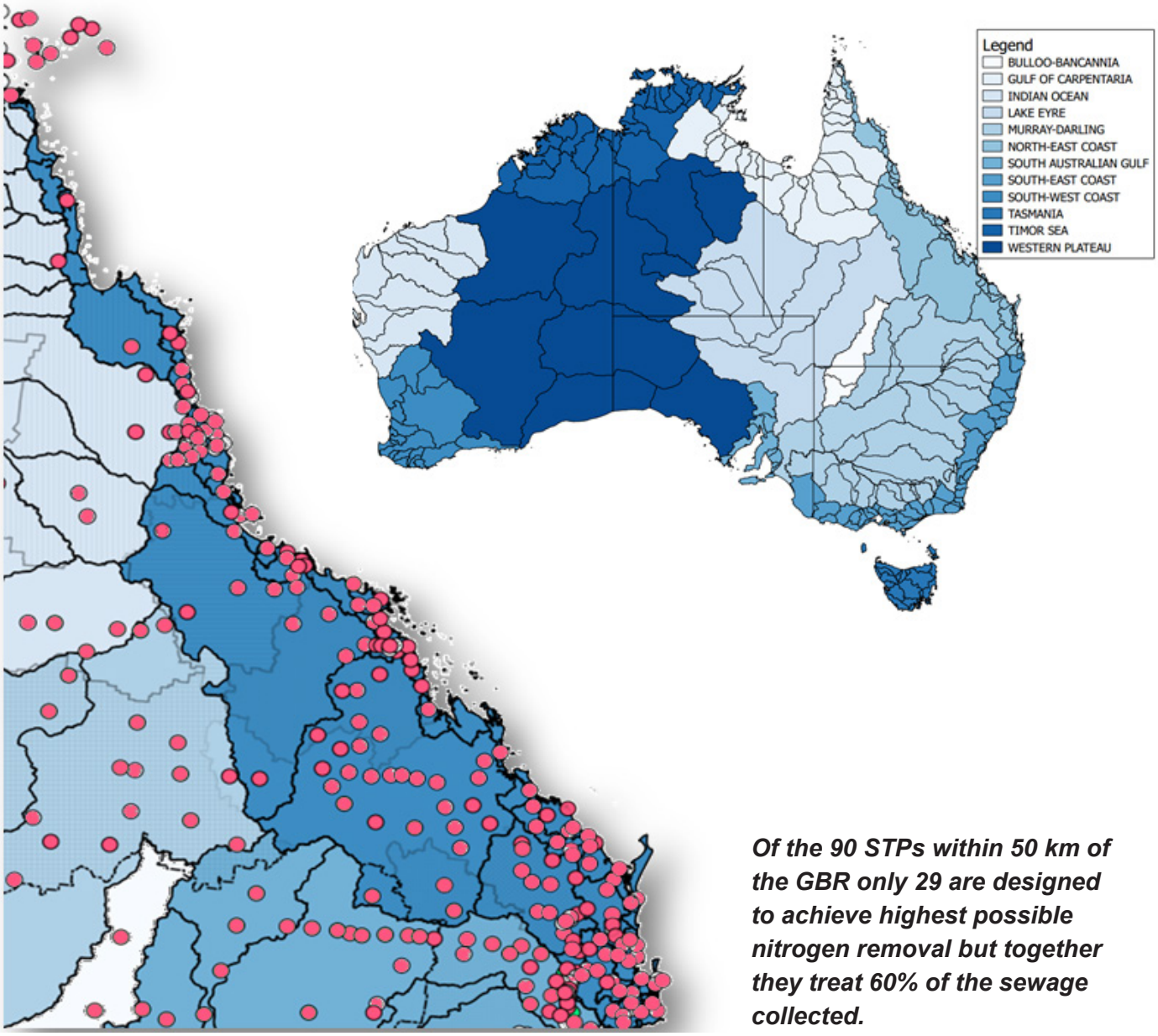
In comparison, it has been shown that the ambitious nitrogen targets set for GBR catchments can be substantially achieved solely through addressing high-risk, catchment sources at an estimated cost of $391m (including initial capital and ongoing operational costs). This means that significant nitrogen reductions can be achieved for substantially less than the investment to date in STP upgrades by focussing on priority sources within the 96% of non-urban load.

In the past STP improvements sensibly focussed on large sources and there remain 61 smaller plants within 50 km of the GBR that have not been upgraded. Together they treat 35% of the total sewage collected representing less than 2% of the total nitrogen load from GBR sources. Costs to upgrade small STPs are relatively high, estimated to be around $719m for the 61 remaining plants with operational costs increased to $33m per year. In other words, upgrading the remaining STPs would cost more than twice the investment required to address priority non-urban sources and would have a fraction of the impact on loads reaching the GBR.

Small STPs cost proportionally more to build than larger ones and cost/L treated is higher. Small communities thus have high per capita costs despite minor contributions to total load.



Sources of the nitrogen impacting the Great Barrier. Sewage Treatment Plants (included in the 'urban' fraction) contribute less than 4% of total catchment loads.



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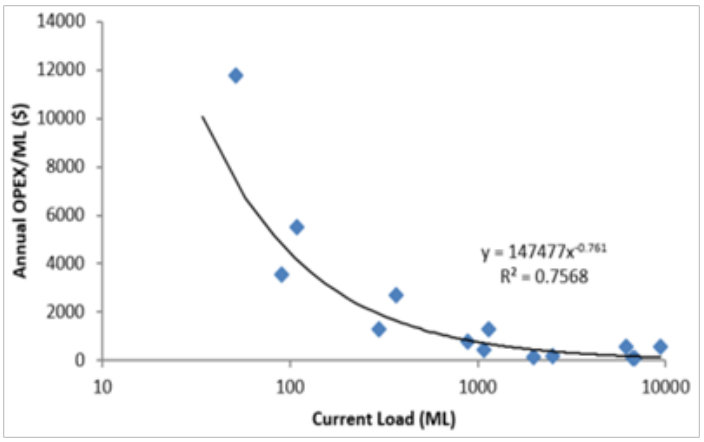
The path ahead

There is a need to recognise the hard-won and expensive improvements to nutrient contributions from STPs in reef catchments and further improvements may be essential to protect local environments. However, it is increasingly difficult to justify the expense of further upgrades on the grounds of additional protection of the GBR.

Investments in STPs and other point sources to date have served only to slow the decline in GBR health. To halt and reverse decline, investment needs to shift to priority sources and a promising approach could be to use nutrient offsets. A well-designed offset approach could avoid costly upgrades to small STPs instead directing investment to catchment activities that more effectively reduce total loads in GBR catchments.



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Footnote: Information based on **qldwater Industry Discussion Paper on Sewage Treatment Plants in Great Barrier Reef catchments, December 2016. Search STP GBR at www.qldwater.com.au.*